

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES



In re Application of )  
Koichi Ashizawa et al ) Art Unit: 1745  
Appln. No. : 09/124,925 ) Ex: T. Dove  
Filed : July 29, 1998 )  
For: CURRENT COLLECTOR WITH )  
PENETRATING HOLES....THEREOF )

# 11/1745  
APR 02 2001  
Appeal Brief  
H. G. B.  
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**BRIEF ON APPEAL (3 COPIES)**

Honorable Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Sir:

Transmitted herewith are three (3) copies of a Brief on Appeal in the above-identified application.

1.  An Oral Hearing is requested.
2.  An Oral Hearing is requested on \_\_\_\_\_.
3.  An extension of time for filing the Brief on Appeal  
( is hereby requested.  
( was requested on \_\_\_\_\_).
4.  A Verified Statement under 37 CFR 1.9 and 1.27  
( is enclosed.  
( is of record in this application.

The fee is calculated as follows:

	Large Entity	Small Entity	Amount
Filing Brief on Appeal	\$310.00	\$150.00	\$310.00
Request for Oral Hearing	260.00	130.00	
Request for Extension of Time for Filing Brief			
<input type="checkbox"/> 1 month	110.00	55.00	
<input checked="" type="checkbox"/> 2 months	380.00	190.00	\$380.00
<input type="checkbox"/> 3 months	870.00	435.00	
<input type="checkbox"/> 4 months	1,360.00	680.00	
<input type="checkbox"/> 5 months	1,850.00	925.00	

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02 FC:116

10.00 CH 380.00 DP

TOTAL DUE: \$ 690.00

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5.  No fee required.

6.  A check/ in the amount of \$690.00 is enclosed.

7.  Please charge Deposit Account No. 10-1213 in the amount of \$ \_\_\_\_\_. A duplicate of this sheet is enclosed.

8.  The Commissioner is hereby authorized to charge payment of the following fees during the pendency of this application or credit any overpayment to Deposit Account No. 10-1213. A duplicate of this sheet is enclosed.

Any patent application processing fees under 37 CFR 1.17.

The Issue Fee set in 37 CFR 1.18 at or before mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b).

Any filing fees under 37 CFR 1.16 for presentation of extra claims.

Respectfully submitted,



Felix J. D'Ambrosio  
Reg. No. 26,721

March 30, 2001

JONES, TULLAR & COOPER, P.C.  
P.O. Box 2266 Eads Station  
Arlington, VA 22202  
(703) 415-1500

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES



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Koichi Ashizawa et al ) Art Unit: 1745  
)  
Appln. No. : 09/124,925 ) Ex: T. Dove  
)  
Filed : July 29, 1998 )  
)  
For : CURRENT COLLECTOR WITH PENETRATING )  
HOLES OF COMPLICATED SHAPE FOR USE )  
IN A SECONDARY BATTERY AND )  
MANUFACTURING PROCESS THEREOF )  
(AS AMENDED) )

**BRIEF ON APPEAL**

Honorable Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Sir:

Pursuant to the provisions of 37 CFR 1.192, submitted herewith is  
Applicant/Appellants' Brief on Appeal.

**REAL PARTY IN INTEREST**

The real party interest, that is the party that holds the entire right, title and interest  
in this application is the assignee, Nippon Foil Manufacturing Co., Ltd.

**RELATED APPEALS AND INTERFERENCES**

No appeal or interference is pending in any related application.

**STATUS OF CLAIMS**

Claims 1, 2 and 4 are finally rejected. No. claims are allowed

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## STATUS OF AMENDMENTS

The final rejection was on June 1, 2000. A Request for Reconsideration with Amendment and a Notice of Appeal was filed on December 1, 2000. In the amendment, claim 1 was changed to replace "non-regular" to "complicated." This was because the examiner held the change of "complicated" to "non-regular" as introducing "new matter" into the application.

## SUMMARY OF THE INVENTION

(page and line references are to the specification)

The present invention relates to a current collector for use in a secondary battery (pg. 1, lines 6 and 7). When coating a surface of a metal foil, such as aluminum foil or copper foil with active material, the metal foil and the active material are difficult to integrate or attach to each other, with the active material dropping out relatively easily. In the preparation of a secondary battery, if a part of the active material, drops out at the time of winding then positive electrode and the negative electrode, there arises a problem of not being able to obtain a secondary battery of a desired capacity. If a part of the active material drops out after the preparation of the secondary battery, there arises another problem that the charge and discharge capacity of the secondary battery is gradually reduced. (pg 1, lines 24 and 25, to pg 2, lines 1-11)

The present invention effectively prevents the active material from dropping out by improving the adherence between each periphery or each inner wall of the penetrating holes and the active material (pg 3, lines 12-15). The current collector according to the present invention is provided with penetrating holes of complicated shape. The invention also relates to a method of producing the current collector (pg 3, lines 20-22).

The current collector according to the present invention satisfies a set of

expressions (pg 4, lines 2-4). When these expressions are satisfied, the penetrating holes have no burrs. According to the method, a metal foil is passed between a concavo-convex roll and a smoothing roll under a predetermined pressure. The holes are formed at the given pressure by the plurality of convex parts on the concavo-convex roll. The metal foil with the holes is then passed between a pair of metal smoothing rolls to remove the burrs. (pg 7, lines 24 and 25 to pg 8, lines 1-25).

### ISSUES

There are two issues in this appeal, namely, (1) are claims 1, 2 and 4 unpatentable under 35 USC 112, ~~first~~ <sup>second</sup> paragraph as indefinite because of the term "complicated;" and (2) are claims 1, 2 and 4 unpatentable under 35 USC 103(a) over Jenkins.

### GROUPING OF THE CLAIMS

Claims 1 and 4 are in independent form, while claim 2 is dependent on claim 1. Claims 1 and 2 are directed to the novel current collector, and claim 4 is directed to the method for producing the current collector.

### ARGUMENT

(1)

The term "complicated" is definite and in full compliance with the requirements of 35 USC 112 and claim 4 is complete

The metallic foils according to the present invention serve as current collectors in, for example, a lithium secondary battery or a lithium-ion battery. The foil desirably has holes (penetrating holes) which penetrate the foil. The hole can have a smooth surface defining its perimeter or it can have a surface which is not smooth. The term used to describe the "not

"smooth" surface was originally "complicated." This term was found by the examiner to be objectionable because "[c]omplicated generally means difficult and it is unclear what a complicated or difficult shape encompasses." (Page 4, of the Office Action of October 7, 1999).

To overcome the objection, "complicated" was modified in the specification to "complicated or irregular," and to "non-regular" in claim 1. These modifications, it was believed, would clarify any confusion, which apparently it did not. Still, the condition of "irregular" or "non-regular" is, it is respectfully submitted, clearly shown in Figs 1 and 2, even if it is found nowhere else.

*then what's  
regular  
hole has  
non-regular  
edge*

The examiner in the latest Office Action takes the position that "or irregular" in the specification is objectionable, and "non-regular" in claim 1 is rejectable. This leaves applicant with no place to go, except back to "complicated," since, presumably, the illustration in Figs 1 and 2 is not supportive, which in fact they are.

Also, the term "complicated" means more than that which the examiner expresses as her understanding. The term "complicated" could mean "difficult" as suggested by the examiner, and such a meaning would not lend much to an understanding of the surface under consideration. However, "complicated" also means "having many interconnected parts," or "marked by an interrelation of diverse and often numerous parts..." (Webster's Third New International Dictionary, page 465, copy enclosed). Considering these definitions, lends more meaning to the concept of the shape of the surface defining the holes. Couple this with Figs. 1 and 2 and, it is respectfully submitted, no confusion should exist.

It is respectfully submitted, therefore, that the term "complicated" should be accepted if "irregular" is not. In either case, those skilled in the art should have no difficulty in understanding what is intended.

To understand claim 4, reference is made to Japanese patent 3-13926. A copy of this patent and the English language abstract were previously filed, and are again filed for completeness. Note Fig. 2 of this patent which shows the roll 3 penetrating the foil 1 to form holes. The roll 3 corresponds to a concavo-convex roll like that used in the present invention. All that is needed is rotation if the roll is configured as a concavo-convex roller.

(2)

Claims 1, 2 and 4 patentably distinguish over Jenkins

Claim 1 defines a current collector with very specific parameters, namely, two equations which must be satisfied to define the surface shape of the penetrating holes. If these equations are not disclosed in Jenkins et al, it is not seen how Jenkins et al can render claim 1 unpatentable. Jenkins et al has no reason to even contemplate the noted equations, because their holes do not have a complicated or irregular shape. Nor is it proper to suggest that Jenkins et al would contemplate the two equations because they are made with a punch die and not a concavo-convex roller.

A reference which teaches a plate with punched holes is not sufficient, it is respectfully submitted, to render a foil with a plurality of penetrating holes satisfying two specific equations, obvious.

Regarding claim 4, it is the convex parts that create the penetrating holes, and the penetrating holes are those defined in claim 1. Claim 4 is therefore a product-by-process claim and as such enjoys the distinctions noted above relative to claim 1. Jenkins et al cannot render

claim 4 unpatentable in the same way that it cannot render claim 1 unpatentable. Also, Jenkins et al does not teach the step of passing the metal foil with the penetrating holes formed therein "further through between a pair of metal smoothing rolls" for the purpose of de-burring the penetrating holes at their periphery.

### SUMMARY

*not in spec*  
The use of the term "complicated" is not indefinite since it is described along with the term "irregular," and because as shown and described those skilled in the art would have no difficulty in understanding what is intended.

The Jenkins et al patent does not teach the claimed relationships recited, nor the convex parts that create the penetrating holes.

Accordingly, the Board should remand this application to the examiner with a finding that claims 1, 2 and 4 are allowed.

Respectfully submitted,



Felix J. D'Ambrosio  
Reg. No. 25,721

March 30, 2001

P.O. Box 2266 Eads Station  
Arlington, VA 22202

Tel: (703) 415-1500  
Fax: (703) 415-1508

## APPENDIX

1. A current collector for use in a secondary battery consisting of a metal foil provided with a plurality of penetrating holes, each of which has a complicated shape without burrs and satisfies the following expressions:

$$0.05 \leq S \leq 50$$

$$1.30 \leq M/N \leq 100$$

where: S is an area expressed in  $\text{mm}^2$  of the penetrating hole, M is a peripheral length expressed in mm of the penetrating hole, and N is a peripheral length expressed in mm of a virtual circle having the area S of the penetrating hole.

2. A current collector for use in a secondary battery according to claim 1, wherein the thickness of the metal foil is in the range of 5 to  $100 \mu\text{m}$ .

4. A method for producing the current collector of claim 1 for use in a secondary battery, comprising the steps of: passing a metal foil without a hole through between a concavo-convex roll having a plurality of convex parts and a smoothing roll under pressure; converting thereby portions of the metal foil without a hole and pressed by the convex parts of the concavo-convex roll into portions with penetrating holes; and passing the metal foil with the penetrating holes further through between a pair of metal smoothing rolls, whereby burrs produced at each periphery of the penetrating holes are removed.



J P 3 - 1 3 9 2 6

TITLE: Manufacture of perforated metal plate

ABSTRACT: To obtain a perforated metal plate without generating a material loss by making a hole by a roll having a lot of projection, turning back its return by a scratching jig, and thereafter, executing a rolling by a roll.

As for a perforating roll 3, a projection 2 is provided in a line in the circumferential direction and the width direction,

A metal plate 1 is fed continuously between the roll 3 and a receiving roll 11. A hole 4 is made by the projection 2, and a return 6 is cut and raised. The metal plate 1 is fed continuously and the return 6 hits against the tip of a scratching jig 5. The return 6 is turned back, and thereafter, rolled by a rolling roll 7. The metal plate 1 is rolled thinly and elongated, and also the return 6 is allowed to gnaw as one body with the metal plate 1, and a perforated metal plate having no burr is obtained. Since there is no punching dust, no material loss is caused, and no burr is generated, therefore, this metal plate can be handled easily.

## ⑪ 特許公報 (B2)

平3-13926

⑫ Int. Cl.

B 21 D 28/10  
28/12  
31/02  
35/00

識別記号

Z

序内整理番号

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⑬ 公告 平成3年(1991)2月25日

発明の数 1 (全3頁)

## ⑭ 発明の名称 孔明き金属板の製造方法

審判 昭62-7741

⑮ 特願 昭58-249601

⑯ 公開 昭60-133936

⑰ 出願 昭58(1983)12月23日

⑭ 昭60(1985)7月17日

⑮ 発明者 吉田 宏明 大阪府門真市大字門真1048番地 松下電工株式会社内

⑮ 発明者 有馬 廣忠 大阪府門真市大字門真1048番地 松下電工株式会社内

⑯ 出願人 松下電工株式会社 大阪府門真市大字門真1048番地

⑯ 代理人 弁理士 石田 長七

審判長 佐々木 晴康 審判官 滝井 有 審判官 影山 秀一

⑭ 参考文献 実公 昭42-15992 (JP, Y1)

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## ⑮ 特許請求の範囲

1 金属板を連続的に送つて多数の突起を有する孔明けローラにて孔を明け、次いで引っかき治具にて孔を明けた返りを折り返し、次いで圧延ローラにて圧延して返りを金属板に食い込ませて全面に亘つて均一な厚さにすることを特徴とする孔明き金属板の製造方法。

## 発明の詳細な説明

## [産業上の利用分野]

本発明は金属板の全面に多数の孔が明いた孔明き金属板を連続的に製造するのに用いる技術に関するものである。

## [従来の技術]

従来、金属板の全面に多数の孔を明ける場合、プレス等による打ち抜きによつて行つてゐたが、打ち抜き屑が出て打ち抜き屑の分だけ材料ロスとなり、また打ち抜いたときばかりができるという欠点があつた。

## [発明が解決しようとする課題]

本発明は叙述の点に鑑みてなされたものであつて、本発明の目的とするところは材料ロスなく確実に孔を明けることができると共にばかりが出ない孔明き金属板の製造方法を提供するにある。

## [課題を解決するための手段]

本発明孔明き金属板の製造方法は、金属板1を

連続的に送つて多数の突起2を有する孔明けローラ3にて孔4を明け、次いで引っかき治具5にて孔4を明けた返り6を折り返し、次いで圧延ローラ7にて圧延して返り6を金属板1に食い込ませて全面に亘つて均一な厚さにすることを特徴とする。

## [作用]

金属板1に孔4を明けるとき本来打ち抜き屑となる部分を返り6として形成し、この返り6を孔4以外の部分に折り返して返り6を圧延にて金属板1に食い込ませることができて、打ち抜き屑をなくして材料ロスなく孔明き金属板8ができる。

## [実施例]

3は孔明けローラであつて、外周に多数の鋸歯状の突起2を周方向及び幅方向に列設してある。つまり第1図に示すように外周に鋸歯状の突起2を周方向に全周に亘つて設けたものを幅方向に適当な間隔を隔てて複数列設けてある。この孔明けローラ3の上方には孔明けローラ3と平行にゴムローラ11のような受けローラ11を配置してあり、孔明けローラ3と受けローラ11を転接させてある。孔明けローラ3及び受けローラ11の両端の軸は夫々軸受け板12に回転自在に支持してある。この受けローラ11の前方(金属板1の進行方向を前とする)には引っかき治具5を配設して

あり、この引っかき治具 5 は断面菱形状に形成され下端が鋭角に尖っている。引っかき治具 5 の下方には金属板 1 の板厚の隙間を介して受け台 13 を配置してあり、受け台 13 の両端を引っかき治具 5 の両端を連結板 14 にて連結してある。この引っかき治具 13 の前方には一对の圧延ローラ 7 を上下に配置してあり、圧延ローラ 7 の両端の軸を軸受け板 15 に回転自在に支持してある。

孔明き金属板 8 を製造するにあたっては、孔明けローラ 3 の手前から鋼板、アルミニウム板、銅板等の金属板 1 を連続的に送り、金属板 1 を孔明けローラ 3 と受けローラ 11 との間に供給する。すると回転する孔明けローラ 3 と受けローラ 11 との間で第2図に示すように突起 2 にて金属板 1 の長手方向及び幅方向に多数の孔 4 が明けられると共に各孔 4 に孔 4 を明けたための返り 6 が第3図に示すように形成される。金属板 1 に孔 4 を明けるとき金属板 1 が第4図に示すように孔明けローラ 3 と受けローラ 11 との間を通過し、孔明けローラ 3 の突起 2 に対応する部分だけ受けローラ 11 が弾性的に凹んでスムーズに孔 4 が明けられると共に返り 6 が形成される。孔 4 を明けた金属板 1 はそのまま連続的に送られて引っかき治具 13 と受け台 13 との間に供給され、引っかき治具 5 の下端である先端に返り 6 が当たつて第5図に示すように返り 6 が折り返される。次いでこの金属板 1 が一对の圧延ローラ 7 間に供給されて圧延される。すると、第6図に示すように金属板 1 が薄く圧延されて伸びると共に返り 6 が金属板 1 に一体に食い込みぱりのない孔明き金属板 8 が形成される。この孔明き金属板 8 は全体が帯板状であり、全面に亘って上下に貫通した孔 4 が形成されており、例えば第7図に示すような樹脂被覆金属板 9 の芯材として用いられる。樹脂被覆金属板 9 を形成する場合、押し出し成形機等で孔明き金属板 8 の両面の全面に亘ってポリ塩化ビニルのような合成樹脂 10 が被覆される。この樹脂被覆金属

板 9 を形成したとき両面の合成樹脂 10 が孔明き金属板 1 の孔 4 を介して一体につながり、両面の合成樹脂 10 が孔明き金属板 8 の両面に強固に密着し、合成樹脂 10 が剥離しない樹脂被覆金属板 9 が得られる。このようにして形成された樹脂被覆金属板 9 は帯板状である。この樹脂被覆金属板 9 は適當な長さに切断して建築板として用いたり、また桶状の折り曲げ加工して雨桶として用いたり、その他の種々の用途に用いたりできる。

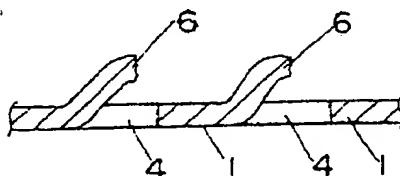
#### 【発明の効果】

本発明は叙述の如く金属板に孔明けローラにて孔を明け、引っかき治具にて孔を明けた返りを折り返し、圧延ローラにて圧延して返りを金属板に食い込ませて全面に亘って均一な厚さにするので、確実に孔が明くのは勿論、孔明けにより生じた返りを金属板に食い込ませてこの返りの材料分だけ余分に金属板を展延できるものであつて、打ち抜き屑が出ず返りを有効利用して材料ロスをなくすことができるものであり、しかもぱりが出ず次工程での取り扱いがしやすいものであり、さらに圧延するとき孔により伸びのばらつきをなおして均一に圧延できるものである。

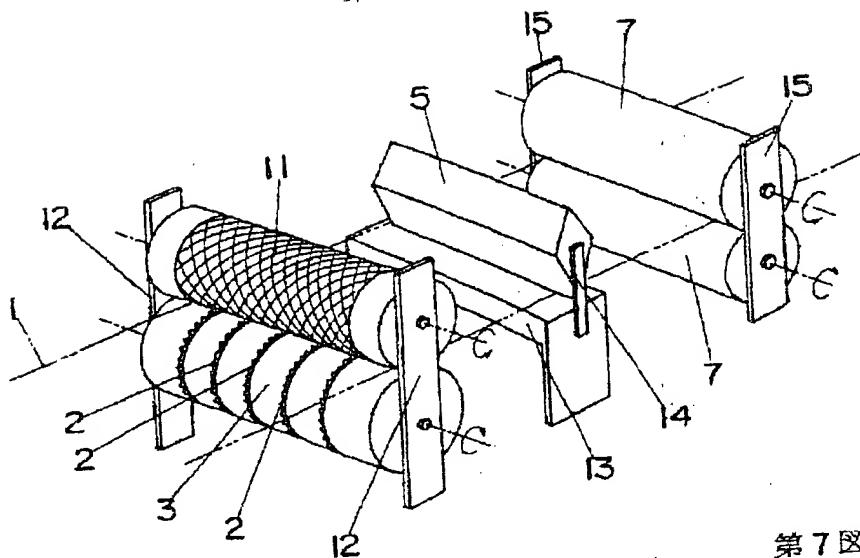
#### 図面の簡単な説明

第1図は本発明方法を実施する装置の斜視図、第2図は同上の金属板に孔明けローラにて孔を明ける状態を示す断面図、第3図は同上の孔明けローラにて孔を明けた状態の断面図、第4図は孔を明けるときの孔明けローラと受けローラの状態を説明する断面図、第5図aは同上の返りを折り返す状態と圧延状態を示す断面図、第5図bは返りの折り返し状態の断面図、第6図は同上により得られた孔明き金属板を示す断面図、第7図は同上の孔明き金属板に合成樹脂を被覆した状態の断面図であつて、1は金属板、2は突起、3は孔明けローラ、4は孔、5は引っかき治具、6は返り、7は圧延ローラである。

第3図

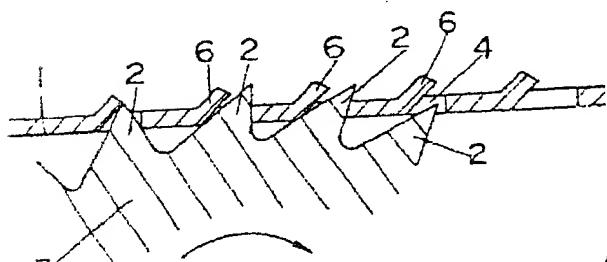


第1圖

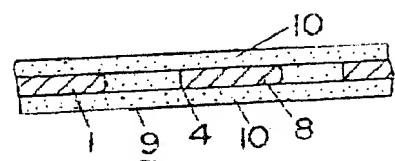


第7回

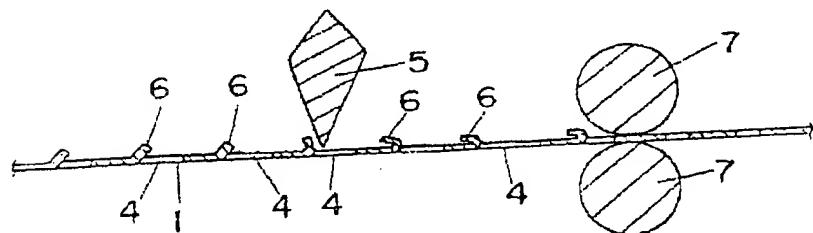
## 第2図



第6回



## 第5回



## 第4圖

